

AF 726

TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
ITL.0764D1US

In Re Application Of: Jack Hwang et al.

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/644,417	August 20, 2003	Mark V. Prenty	21906	2822	6957

Invention: Forming Strained Source Drain Junction Field Effect Transistors

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on November 16, 2004.

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Dated: January 11, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant:

Jack Hwang et al.

§

Art Unit: 2822

Serial No.: 10/644,417

§

Examiner: Mark V. Prenty

Filed: August 20, 2003

§

Docket: ITL.0764D1US
P14416D

For: Forming Strained Source Drain
Junction Field Effect Transistors

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APPEAL BRIEF

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REAL PARTY IN INTEREST

The real party in interest is the assignee Intel Corporation.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1-19 (Canceled).

Claims 20-24 (Rejected).

Claims 20-24 are rejected and are the subject of this Appeal Brief.

STATUS OF AMENDMENTS

All amendments have been entered.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 20 calls for a semiconductor structure. See Figure 1, item 10. It further calls for a gate formed on said semiconductor structure. See Figure 1, item 14, and the specification at page 3, lines 15 and 16. Finally, claim 20 calls for a p-type source and a p-type drain region. See Figure 5, items 17 and 18 and the specification at page 4, lines 8-16. The claim further calls for the source and drain regions including both germanium and a p-type source/drain impurity. In the illustrated embodiment, the p-type source/drain impurity may be boron. The germanium region is the region 17, which is shown in Figure 3 and described in the specification at page 3, lines 17 through page 4, line 2.

Finally, the claim calls for the source and drain regions being strained. The addition of the high dose germanium implants may add strain to improve hole mobility for PMOS devices. See the specification at page 5, lines 1-3.

At this point, no issue has been raised that would suggest that the words in the claims have any meaning other than their ordinary meanings. Nothing in this section should be taken as an indication that any claim term has a meaning other than its ordinary meaning.

GROUNDΣ OF REJECTION TO BE REVIEWED ON APPEAL

- A. Are Claims 20-24 Anticipated by Yu?
- B. Are Claims 20, 23, and 24 Anticipated by Liu?

ARGUMENT

A. Are Claims 20-24 Anticipated by Yu?

Claim 20 calls for the source drain regions to be strained. At certain germanium concentration strain may occur. However, all the reference talks about is dose. Dose is the rate at which impurities are added. Without knowing rate and time or concentration, there is no way to deduce from the findings of the present application if strain occurs.

The patent to Yu talks about dose, not concentration. Therefore, it is uninforming as to concentration. Moreover, it is silent on whether or not strained source/drain regions are formed. Without knowing what Yu actually did, there is no way to determine that Yu formed strained source/drain regions. Since strained source/drain regions need not necessarily form, there can be no finding of inherency.

Therefore, the rejection based on Yu should be reversed.

B. Are Claims 20, 23, and 24 Anticipated by Liu?

The patent to Liu simply uses a germanium implant to make amorphous (damaged) silicon. Then, the amorphous region is melted. There is no basis to conclude that, under such unusual circumstances, a strained junction results. Since it cannot be presumed that a strained source/drain junction occurs there is no basis for a rejection based on Liu.

Liu cannot inherently form a strained source/drain junction since there is no way to know what the effect of amorphization, melting, or other variables on the process have on whether or not a strained source/drain junction ends up being formed. Liu never suggests that a strained source/drain junction is formed.

Moreover, Liu only talks about dose, which does not tell you anything about concentration. Dose is simply the rate at which the species are implanted. Concentration is a function of dose and time. Without knowing time, one cannot deduce concentration from dose.

In the renewed final rejection, the Examiner suggests that the Applicants do not dispute that the germanium concentration in Liu's region is different. The point that Applicants were trying to make was that, since Liu uses an amorphous region, concentration has no meaning. Concentration can have no effect in the amorphous or totally disordered structure. The structure is damaged and, therefore, whatever impurities are provided at whatever concentration would not

necessarily have any effect that they would have in a non-amorphous or crystalline region. In other words, there is no reason to conclude from the fact that certain things happen in non-amorphous, crystal structures that the same things would happen in amorphous non-crystal structures.

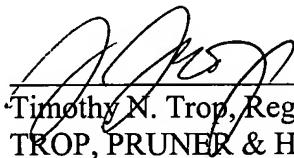
Therefore, an argument of inherency cannot lie. Moreover, since the reference does not talk about any type of strained junction, it is hard to believe that one is formed.

In point of fact, it is hard to even imagine talking about a junction in an amorphous semiconductor. Because it is amorphous, it is resistive and disordered. Therefore, there can be no junction, there can be no source drain, and it makes no sense to talk about a strained junction.

Applicants respectfully request that the final rejections be reversed and that the claims subject to this Appeal be allowed to issue.

Respectfully submitted,

Date: January 11, 2005



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CLAIMS APPENDIX

The claims on appeal are:

20. An integrated circuit comprising:
 - a semiconductor structure;
 - a gate formed on said semiconductor structure; and
 - a P-type source and a P-type drain region, said source and drain regions including both germanium and a P-type source/drain impurity, said source and drain regions being strained.
21. The circuit of claim 20 wherein the ratio of germanium to P-type source/drain impurity is greater than one to one.
22. The circuit of claim 20 wherein the ratio of germanium to P-type source/drain impurity is approximately four to one.
23. The circuit of claim 20 wherein said source and drain regions are source and drain extensions.
24. The circuit of claim 20 wherein said source/drain region that includes both boron and germanium is a source/drain extension.